

CLAIMS

What is claimed is:

1. A paper edge sensing apparatus in a printer, comprising:
  - a carrier;
  - a printer head mounted to the carrier;
  - a first paper sensor mounted to the carrier a predetermined distance from the printer head; and
  - a controller controlling operations of the printer head according to a signal from the first paper sensor; and
  - wherein a paper print margin comprises the predetermined distance between the first paper sensor and the printer head.
2. The apparatus of claim 1, wherein the first paper sensor comprises:
  - an optical sensor mounted in the carrier and having a light emitter emitting light, a light receiver receiving light, and a reflection surface to reflect light emitted from the light emitter to the light receiver.
3. The apparatus of claim 2, wherein the reflection surface is transversely arranged across a paper convey direction.
4. The apparatus of claim 1, wherein the paper print margin includes a top, bottom, left, and right print margin spaced a predetermined distance from a top, bottom, left, and right edge of a sheet of paper, respectively.
5. The apparatus of claim 4, wherein the predetermined distance is in a range between 0.5 to 1mm.
6. The apparatus of claim 1, further comprising:
  - a second paper sensor mounted between a pickup unit and the convey unit to detect a top edge and a bottom edge of a sheet of paper.
7. The apparatus of claim 6, wherein the second paper sensor comprises an optical

sensor provided with a light emitter emitting light, a light receiver receiving light, and a sensor actuator rotatably mounted to the frame.

8. The apparatus of claim 1, further comprising:  
an encoder detecting a movement amount of the carrier.

9. A paper edge sensing method in a printer having a first paper sensor mounted in a fixed position relative to a moving printer head, comprising:

detecting a top edge or a bottom edge of a sheet of paper using the first paper sensor to output a corresponding first top edge detection signal or a first bottom edge detection signal;  
and

generating a begin print command when the top edge is detected and an end print command when the bottom edge is detected.

10. The method of claim 9, wherein the printer comprises a second paper sensor disposed between a pickup unit and a convey unit and further comprising:

detecting the top or the bottom edge of the sheet using the second paper sensor;  
begin counting a start print time interval or an end print time interval upon detection of the top or the bottom edge, respectively; and

wherein the generating includes generating the begin print command at the later of the begin print time interval or the top edge first detection signal and the end print command at the later of the end print time interval or the bottom edge first detection signal.

11. The method of claim 10, wherein the printer comprises a controller and the method further comprises:

transmitting the first top edge detection signal and the first bottom edge detection signal to the controller;  
counting the start print time interval and the end print time interval using the controller;  
comparing the start print time interval to the first top edge detection signal and the second print time interval to the first bottom edge detection signal using the controller; and  
controlling operation of the printer head based on a command from the controller.

12. The method of claim 9, wherein the printer comprises a pickup unit and a convey unit and further comprising:

controlling dynamic power switching from the pickup unit to the convey unit with the controller.

13. The method of claim 9, further comprising:

detecting a left edge or a right edge of the sheet of paper when the first paper sensor moves transversely to the left edge or the right edge of the sheet of paper.

14. The method of claim 9, the printer comprising the first paper sensor and the printer head mounted to a movable carrier and the method further comprising:

identifying a first detection signal as either of the first top edge detection signal or the first bottom edge detection signal if the first detection signal is generated when the carrier is located at an initial position in a central portion of a width of a sheet.

15. The method of claim 9, the printer comprising the first paper sensor and the printer head mounted to a movable carrier and the method further comprising:

identifying a first detection signal as either a first right edge detection signal or a first left edge detection signal if the first detection signal is generated when the carrier is located outside of an initial position in a central portion of a width of the sheet.

16. The method of claim 9, the printer comprising a pickup unit and further comprising:

picking up the sheet to print thereon.

17. The method of claim 9, further comprising:

selecting a general print mode to place margins on the sheet.

18. The method of claim 9, further comprising:

selecting a borderless print mode such that no margins are placed on the sheet.

19. The method of claim 9, further comprising:

tracking a position of the first paper sensor.

20. The method of claim 9, further comprising:

externally discharging an image-printed sheet from the printer.